

work began at Los Alamos National Laboratory in 1977. Modeling and computations were followed by construction of a proof-of-principle device that was demonstrated in 1980.

The RFQ concept can be implemented over a wide range of voltages, frequencies, and physical dimensions, and fusion scientists were among the first to take advantage of these characteristics. An RFQ linac for the Fusion Material Irradiation Test (FMIT) facility was constructed and successfully operated.

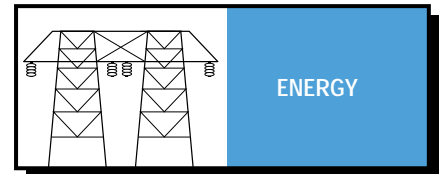
The development work carried out for the FMIT RFQ has paid off in a variety of applications. RFQ linacs are now widely used in physics research, both as the first stage of larger linacs and in experiments to test theories about elementary particles.

With an RFQ as its first stage, a linear accelerator can produce energetic charged particles that are focused into thin beams. Since the beams lose most of their energy in a small volume of tissue, they can destroy the cells in a tumor without damaging the surrounding healthy tissue.

As part of a larger accelerator system, the RFQ is well suited for the production of radioactive isotopes, including radionuclides used in medical diagnostics. The RFQ has also been proposed as the initial stage for linacs producing neutral particle beams for missile defense in space.

As a stand-alone system, the RFQ can produce short-lived medical radionuclides, implant ions into metals and semiconductors, and produce neutron and gamma radiation for materials inspection and research. The RFQ may also provide new ways of applying inspection techniques such as activation analysis, a means of detecting plastic explosives in airline baggage, and neutron radiography, an analysis technique established using neutrons from reactors. Because the RFQ linac is a mobile source of neutrons, it should be a good candidate for extension of this technique to tasks such as inspecting explosive charges in artillery shells, finding cracks and corrosion in aircraft, and analyzing rocket engines during test firing.

The RFQ has been commercialized by AccSys Technology, Inc., a company started by Los Alamos scientists.



ENERGY



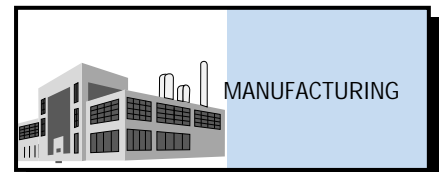
ENVIRONMENT



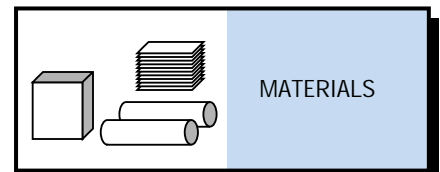
DEFENSE



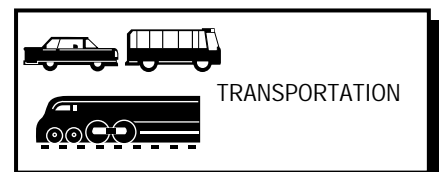
AEROSPACE



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